

Electron-nuclear coupling: New approaches for chemical and molecular physics

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I will describe research that focuses on microscopic aspects of polyatomic molecular photoionization, and in particular, the ubiquitous electronic-vibrational coupling that accompanies this process. Photoionization phenomena frequently illuminate fundamental molecular scattering dynamics, and are theoretically tractable. The continuum electron can induce vibrational excitations as it traverses the anisotropic molecular field, and can do so with a remarkable degree of mode-specificity. For polyatomic systems, our understanding of such photoelectron scattering is primitive, because only recently have the salient experiments been possible. Thus, there is an extensive unexplored area where studies are both feasible and desirable. They are enabled by the Advanced Light Source, in combination with the efforts of theorists using Schwinger variational scattering calculations that facilitate detailed interpretations of the experiments.

This work is done in collaboration with John Bozek (ALS) and Robert Lucchese (Texas A&M).